SEQUENCE LISTING

<110> Statens Serum Institut

<120> Tuberculosis vaccine and diagnostics
based on the Mycobacterium tuberculosis esat-6 gene family

<130> 23388us1

<160> 59

<170> FastSEQ for Windows Version 3.0

<210> 1
<211> 100
<212> PRT
<213> M.Tuberculosis

<400> 1
Met Ala Glu Met Lys Thr Asp Ala Ala Thr Leu Ala Gln Glu Ala Gly
 1   5   10   15
Asn Phe Glu Arg Ile Ser Gly Asp Leu Lys Thr Gln Ile Asp Gln Val
            20   25   30
Glu Ser Thr Ala Gly Ser Leu Gln Gly Gln Trp Arg Gly Ala Ala Gly
        35   40   45
Thr Ala Ala Gln Ala Ala Val Val Arg Phe Gln Glu Ala Ala Asn Lys
    50   55   60
Gln Lys Gln Glu Leu Asp Glu Ile Ser Thr Asn Ile Arg Gln Ala Gly
65   70   75   80
Val Gln Tyr Ser Arg Ala Asp Glu Glu Gln Gln Gln Ala Leu Ser Ser
                85   90   95
Gln Met Gly Phe
            100

<210> 2
<211> 95
<212> PRT
<213> M.Tuberculosis

<400> 2
Met Thr Glu Gln Gln Trp Asn Phe Ala Gly Ile Glu Ala Ala Ala Ser
 1   5   10   15
Ala Ile Gln Gly Asn Val Thr Ser Ile His Ser Leu Leu Asp Glu Gly
            20   25   30
Lys Gln Ser Leu Thr Lys Leu Ala Ala Ala Trp Gly Gly Ser Gly Ser
        35   40   45
Glu Ala Tyr Gln Gly Val Gln Gln Lys Trp Asp Ala Thr Ala Thr Glu
    50   55   60
Leu Asn Asn Ala Leu Gln Asn Leu Ala Arg Thr Ile Ser Glu Ala Gly
65   70   75   80
Gln Ala Met Ala Ser Thr Glu Gly Asn Val Thr Gly Met Phe Ala
                85   90   95

<210> 3
<211> 96
<212> PRT
<213> M.Tuberculosis

<400> 3
Met Ser Gln Ile Met Tyr Asn Tyr Pro Ala Met Leu Gly His Ala Gly
 1   5   10   15
Asp Met Ala Gly Tyr Ala Gly Thr Leu Gln Ser Leu Gly Ala Glu Ile

```
            20                  25                  30
Ala Val Glu Gln Ala Ala Leu Gln Ser Ala Trp Gln Gly Asp Thr Gly
        35                  40                  45
Ile Thr Tyr Gln Ala Trp Gln Ala Gln Trp Asn Gln Ala Met Glu Asp
    50                  55                  60
Leu Val Arg Ala Tyr His Ala Met Ser Ser Thr His Glu Ala Asn Thr
65                  70                  75                  80
Met Ala Met Met Ala Arg Asp Thr Ala Glu Ala Ala Lys Trp Gly Gly
                85                  90                  95
```

<210> 4
<211> 294
<212> DNA
<213> M Tuberculosis

<220>
<221> CDS
<222> (1)...(294)

<400> 4

```
atg agc ctt ttg gat gct cat atc cca cag ttg gtg gcc tcc cag tcg       48
Met Ser Leu Leu Asp Ala His Ile Pro Gln Leu Val Ala Ser Gln Ser
 1               5                  10                  15

gcg ttt gcc gcc aag gcg ggg ctg atg cgg cac acg atc ggt cag gcc       96
Ala Phe Ala Ala Lys Ala Gly Leu Met Arg His Thr Ile Gly Gln Ala
            20                  25                  30

gag cag gcg gcg atg tcg gct cag gcg ttt cac cag ggg gag tcg tcg      144
Glu Gln Ala Ala Met Ser Ala Gln Ala Phe His Gln Gly Glu Ser Ser
        35                  40                  45

gcg gcg ttt cag gcc gcc cat gcc cgg ttt gtg gcg gcg gcc gcc aaa      192
Ala Ala Phe Gln Ala Ala His Ala Arg Phe Val Ala Ala Ala Ala Lys
    50                  55                  60

gtc aac acc ttg ttg gat gtc gcg cag gcg aat ctg ggt gag gcc gcc      240
Val Asn Thr Leu Leu Asp Val Ala Gln Ala Asn Leu Gly Glu Ala Ala
65                  70                  75                  80

ggt acc tat gtg gcc gcc gat gct gcg gcc gcg tcg acc tat acc ggg      288
Gly Thr Tyr Val Ala Ala Asp Ala Ala Ala Ala Ser Thr Tyr Thr Gly
                85                  90                  95

ttc tga                                                             294
Phe  *
```

<210> 5
<211> 97
<212> PRT
<213> M Tuberculosis

<400> 5

```
Met Ser Leu Leu Asp Ala His Ile Pro Gln Leu Val Ala Ser Gln Ser
 1               5                  10                  15
Ala Phe Ala Ala Lys Ala Gly Leu Met Arg His Thr Ile Gly Gln Ala
            20                  25                  30
Glu Gln Ala Ala Met Ser Ala Gln Ala Phe His Gln Gly Glu Ser Ser
        35                  40                  45
Ala Ala Phe Gln Ala Ala His Ala Arg Phe Val Ala Ala Ala Ala Lys
    50                  55                  60
```

```
Val Asn Thr Leu Leu Asp Val Ala Gln Ala Asn Leu Gly Glu Ala Ala
65                  70                  75                  80
Gly Thr Tyr Val Ala Ala Asp Ala Ala Ala Ala Ser Thr Tyr Thr Gly
                85                  90                  95
Phe
```

<210> 6
<211> 339
<212> DNA
<213> M Tuberculosis

<220>
<221> CDS
<222> (1)...(339)

<400> 6

```
ttg atc ccc ggt cgg atg gtg ctg aac tgg gaa gat ggc ctc aat gcc        48
Leu Ile Pro Gly Arg Met Val Leu Asn Trp Glu Asp Gly Leu Asn Ala
 1               5                  10                  15

ctt gtt gcg gaa ggg att gag gcc atc gtg ttt cgt act tta ggc gat        96
Leu Val Ala Glu Gly Ile Glu Ala Ile Val Phe Arg Thr Leu Gly Asp
            20                  25                  30

cag tgc tgg ttg tgg gag tcg ctg ctg ccc gac gag gtg cgc cga ctg       144
Gln Cys Trp Leu Trp Glu Ser Leu Leu Pro Asp Glu Val Arg Arg Leu
        35                  40                  45

ccc gag gaa ctg gcc cgg gtg gac gca ttg ttg gac gat ccg gcg ttc       192
Pro Glu Glu Leu Ala Arg Val Asp Ala Leu Leu Asp Asp Pro Ala Phe
    50                  55                  60

ttc gcc ccg ttc gtg ccg ttc ttc gac ccg cgc agg ggc cgg ccg tcg       240
Phe Ala Pro Phe Val Pro Phe Phe Asp Pro Arg Arg Gly Arg Pro Ser
65                  70                  75                  80

acg ccg atg gag gtc tat ctg cag ttg atg ttt gtg aag ttc cgc tac       288
Thr Pro Met Glu Val Tyr Leu Gln Leu Met Phe Val Lys Phe Arg Tyr
                85                  90                  95

cgg ctg ggc tat gag tcg ctg tgc cgg gag gtg gct gat tcg atc acc       336
Arg Leu Gly Tyr Glu Ser Leu Cys Arg Glu Val Ala Asp Ser Ile Thr
            100                 105                 110

tga                                                                   339
```

<210> 7
<211> 112
<212> PRT
<213> M Tuberculosis

<400> 7

```
Met Ile Pro Gly Arg Met Val Leu Asn Trp Glu Asp Gly Leu Asn Ala
 1               5                  10                  15
Leu Val Ala Glu Gly Ile Glu Ala Ile Val Phe Arg Thr Leu Gly Asp
            20                  25                  30
Gln Cys Trp Leu Trp Glu Ser Leu Leu Pro Asp Glu Val Arg Arg Leu
        35                  40                  45
Pro Glu Glu Leu Ala Arg Val Asp Ala Leu Leu Asp Asp Pro Ala Phe
    50                  55                  60
Phe Ala Pro Phe Val Pro Phe Phe Asp Pro Arg Arg Gly Arg Pro Ser
65                  70                  75                  80
```

```
Thr Pro Met Glu Val Tyr Leu Gln Leu Met Phe Val Lys Phe Arg Tyr
                85                  90                  95
Arg Leu Gly Tyr Glu Ser Leu Cys Arg Glu Val Ala Asp Ser Ile Thr
            100                 105                 110
```

<210> 8
<211> 285
<212> DNA
<213> M Tuberculosis

<220>
<221> CDS
<222> (1)...(285)

<400> 8

```
atg acc atc aac tat caa ttc ggg gac gtc gac gct cac ggc gcc atg       48
Met Thr Ile Asn Tyr Gln Phe Gly Asp Val Asp Ala His Gly Ala Met
 1               5                  10                  15

atc cgc gct cag gcc ggg tcg ctg gag gcc gag cat cag gcc atc att       96
Ile Arg Ala Gln Ala Gly Ser Leu Glu Ala Glu His Gln Ala Ile Ile
            20                  25                  30

tct gat gtg ttg acc gcg agt gac ttt tgg ggc ggc gcc ggt tcg gcg      144
Ser Asp Val Leu Thr Ala Ser Asp Phe Trp Gly Gly Ala Gly Ser Ala
        35                  40                  45

gcc tgc cag ggg ttc att acc cag ctg ggc cgt aac ttc cag gtg atc      192
Ala Cys Gln Gly Phe Ile Thr Gln Leu Gly Arg Asn Phe Gln Val Ile
    50                  55                  60

tac gag cag gcc aac gcc cac ggg cag aag gtg cag gct gcc ggc aac      240
Tyr Glu Gln Ala Asn Ala His Gly Gln Lys Val Gln Ala Ala Gly Asn
65                  70                  75                  80

aac atg gca caa acc gac agc gcc gtc ggc tcc agc tgg gcc taa          285
Asn Met Ala Gln Thr Asp Ser Ala Val Gly Ser Ser Trp Ala  *
                85                  90
```

<210> 9
<211> 94
<212> PRT
<213> M Tuberculosis

<400> 9

```
Met Thr Ile Asn Tyr Gln Phe Gly Asp Val Asp Ala His Gly Ala Met
 1               5                  10                  15
Ile Arg Ala Gln Ala Gly Leu Leu Glu Ala Glu His Gln Ala Ile Val
            20                  25                  30
Arg Asp Val Leu Ala Ala Gly Asp Phe Trp Gly Gly Ala Gly Ser Val
        35                  40                  45
Ala Cys Gln Glu Phe Ile Thr Gln Leu Gly Arg Asn Phe Gln Val Ile
    50                  55                  60
Tyr Glu Gln Ala Asn Ala His Gly Gln Lys Val Gln Ala Ala Gly Asn
65                  70                  75                  80
Asn Met Ala Gln Thr Asp Ser Ala Val Gly Ser Ser Trp Ala
                85                  90
```

<210> 10
<211> 285
<212> DNA
<213> M Tuberculosis

<220>
<221> CDS
<222> (1)...(282)

<400> 10
atg acc atc aac tat cag ttc ggt gat gtc gac gct cat ggc gcc atg 48
Met Thr Ile Asn Tyr Gln Phe Gly Asp Val Asp Ala His Gly Ala Met
 1   5   10   15

atc cgc gct cag gcc ggg ttg ctg gag gcg gag cat cag gcc atc gtt 96
Ile Arg Ala Gln Ala Gly Leu Leu Glu Ala Glu His Gln Ala Ile Val
            20   25   30

cgt gat gtg ttg gcc gcg ggt gac ttt tgg ggc ggc gcc ggt tcg gtg 144
Arg Asp Val Leu Ala Ala Gly Asp Phe Trp Gly Gly Ala Gly Ser Val
        35   40   45

gct tgc cag gag ttc att acc cag ttg ggc cgt aac ttc cag gtg atc 192
Ala Cys Gln Glu Phe Ile Thr Gln Leu Gly Arg Asn Phe Gln Val Ile
    50   55   60

tac gag cag gcc aac gcc cac ggg cag aag gtg cag gct gcc ggc aac 240
Tyr Glu Gln Ala Asn Ala His Gly Gln Lys Val Gln Ala Ala Gly Asn
65   70   75   80

aac atg gca caa acc gac agc gcc gtc ggc tcc agc tgg gcc 282
Asn Met Ala Gln Thr Asp Ser Ala Val Gly Ser Ser Trp Ala
                85   90

tga 285

<210> 11
<211> 94
<212> PRT
<213> M Tuberculosis

<400> 11
Met Thr Ile Asn Tyr Gln Phe Gly Asp Val Asp Ala His Gly Ala Met
 1   5   10   15
Ile Arg Ala Gln Ala Gly Leu Leu Glu Ala Glu His Gln Ala Ile Val
            20   25   30
Arg Asp Val Leu Ala Ala Gly Asp Phe Trp Gly Gly Ala Gly Ser Val
        35   40   45
Ala Cys Gln Glu Phe Ile Thr Gln Leu Gly Arg Asn Phe Gln Val Ile
    50   55   60
Tyr Glu Gln Ala Asn Ala His Gly Gln Lys Val Gln Ala Ala Gly Asn
65   70   75   80
Asn Met Ala Gln Thr Asp Ser Ala Val Gly Ser Ser Trp Ala
                85   90

<210> 12
<211> 327
<212> DNA
<213> M Tuberculosis

<220>
<221> CDS
<222> (1)...(327)

<400> 12
gtg ctt ttg cct ctt ggt ccg cct ttg ccg ccc gac gcg gtg gtg gcg 48
Val Leu Leu Pro Leu Gly Pro Pro Leu Pro Pro Asp Ala Val Val Ala

```
 1               5                  10                  15

aaa cgg gct gag tcg gga atg ctc ggc ggg ttg tcg gtt ccg ctc agc       96
Lys Arg Ala Glu Ser Gly Met Leu Gly Gly Leu Ser Val Pro Leu Ser
            20                  25                  30

tgg gga gtg gct gtg cca ccc gat gat tat gac cac tgg gcg cct gcg      144
Trp Gly Val Ala Val Pro Pro Asp Asp Tyr Asp His Trp Ala Pro Ala
        35                  40                  45

ccg gag gac ggc gcc gat gtc gat gtc cag gcg gcc gaa ggg gcg gac      192
Pro Glu Asp Gly Ala Asp Val Asp Val Gln Ala Ala Glu Gly Ala Asp
    50                  55                  60

gca gag gcc gcg gcc atg gac gag tgg gat gag tgg cag gcg tgg aac      240
Ala Glu Ala Ala Ala Met Asp Glu Trp Asp Glu Trp Gln Ala Trp Asn
65                  70                  75                  80

gag tgg gtg gcg gag aac gct gaa ccc cgc ttt gag gtg cca cgg agt      288
Glu Trp Val Ala Glu Asn Ala Glu Pro Arg Phe Glu Val Pro Arg Ser
                85                  90                  95

agc agc agc gtg att ccg cat tct ccg gcg gcc ggc tag                 327
Ser Ser Ser Val Ile Pro His Ser Pro Ala Ala Gly  *
            100                 105


<210> 13
<211> 108
<212> PRT
<213> M Tuberculosis

<400> 13
Met Leu Leu Pro Leu Gly Pro Pro Leu Pro Pro Asp Ala Val Val Ala
 1               5                  10                  15
Lys Arg Ala Glu Ser Gly Met Leu Gly Gly Leu Ser Val Pro Leu Ser
            20                  25                  30
Trp Gly Val Ala Val Pro Pro Asp Asp Tyr Asp His Trp Ala Pro Ala
        35                  40                  45
Pro Glu Asp Gly Ala Asp Val Asp Val Gln Ala Ala Glu Gly Ala Asp
    50                  55                  60
Ala Glu Ala Ala Ala Met Asp Glu Trp Asp Glu Trp Gln Ala Trp Asn
65                  70                  75                  80
Glu Trp Val Ala Glu Asn Ala Glu Pro Arg Phe Glu Val Pro Arg Ser
                85                  90                  95
Ser Ser Ser Val Ile Pro His Ser Pro Ala Ala Gly
            100                 105

<210> 14
<211> 324
<212> DNA
<213> M Tuberculosis

<220>
<221> CDS
<222> (1)...(324)

<400> 14
ttg acc cac aag cgc act aaa cgc cag cca gcc atc gcc gca ggg ctc       48
Leu Thr His Lys Arg Thr Lys Arg Gln Pro Ala Ile Ala Ala Gly Leu
 1               5                  10                  15

aac gcc ccg cgt cgg aat cgc gtt ggg cgg caa cat ggt tgg ccg gcc       96
```

```
Asn Ala Pro Arg Arg Asn Arg Val Gly Arg Gln His Gly Trp Pro Ala
            20                  25                  30

gac gtt ccg tcc gcc gag cag cgc cgc gcc caa cgg cag cgc gac ctc      144
Asp Val Pro Ser Ala Glu Gln Arg Arg Ala Gln Arg Gln Arg Asp Leu
         35                  40                  45

gag gct atc cgc cga gcg tac gcc gag atg gtg gcg aca tca cac gaa      192
Glu Ala Ile Arg Arg Ala Tyr Ala Glu Met Val Ala Thr Ser His Glu
     50                  55                  60

atc gac gac gac aca gcc gaa ctg gcg ctg ttg tcg atg cat ctc gac      240
Ile Asp Asp Asp Thr Ala Glu Leu Ala Leu Leu Ser Met His Leu Asp
 65                  70                  75                  80

gat gag cag cgc cgg ctt gag gcg ggg atg aag ctc ggc tgg cat ccg      288
Asp Glu Gln Arg Arg Leu Glu Ala Gly Met Lys Leu Gly Trp His Pro
                 85                  90                  95

tat cac ttc ccc gac gaa ccc gac agc aaa cag tga                      324
Tyr His Phe Pro Asp Glu Pro Asp Ser Lys Gln  *
            100                 105


<210> 15
<211> 107
<212> PRT
<213> M Tuberculosis

<400> 15
Met Thr His Lys Arg Thr Lys Arg Gln Pro Ala Ile Ala Ala Gly Leu
 1               5                  10                  15
Asn Ala Pro Arg Arg Asn Arg Val Gly Arg Gln His Gly Trp Pro Ala
            20                  25                  30
Asp Val Pro Ser Ala Glu Gln Arg Arg Ala Gln Arg Gln Arg Asp Leu
        35                  40                  45
Glu Ala Ile Arg Arg Ala Tyr Ala Glu Met Val Ala Thr Ser His Glu
    50                  55                  60
Ile Asp Asp Asp Thr Ala Glu Leu Ala Leu Leu Ser Met His Leu Asp
65                  70                  75                  80
Asp Glu Gln Arg Arg Leu Glu Ala Gly Met Lys Leu Gly Trp His Pro
                85                  90                  95
Tyr His Phe Pro Asp Glu Pro Asp Ser Lys Gln
            100                 105

<210> 16
<211> 246
<212> DNA
<213> M Tuberculosis

<220>
<221> CDS
<222> (1)...(246)

<400> 16
atg agc ggc cac gcg ttg gct gct cgg acg ttg ctg gcc gcc gcg gac       48
Met Ser Gly His Ala Leu Ala Ala Arg Thr Leu Leu Ala Ala Ala Asp
 1               5                  10                  15

gag ctt gtc ggc ggc ccg cca gtc gag gct tcg gcc gcc gcg ctg gcc       96
Glu Leu Val Gly Gly Pro Pro Val Glu Ala Ser Ala Ala Ala Leu Ala
            20                  25                  30
```

```
ggc gac gcc gcg ggc gca tgg cgg acc gcg gcc gtc gag ctt gcg cga      144
Gly Asp Ala Ala Gly Ala Trp Arg Thr Ala Ala Val Glu Leu Ala Arg
         35                  40                  45

gcg ttg gtc cgc gct gtg gcg gag tcg cac ggc gtc gcg gcc gtt ttg      192
Ala Leu Val Arg Ala Val Ala Glu Ser His Gly Val Ala Ala Val Leu
     50                  55                  60

ttc gcc gcg acg gcc gcc gcg gcg gcg gcc gtc gac cgg ggt gat ccg      240
Phe Ala Ala Thr Ala Ala Ala Ala Ala Ala Val Asp Arg Gly Asp Pro
 65                  70                  75                  80

ccg tga                                                             246
Pro  *
```

<210> 17
<211> 81
<212> PRT
<213> M Tuberculosis

<400> 17

```
Met Ser Gly His Ala Leu Ala Ala Arg Thr Leu Leu Ala Ala Ala Asp
 1               5                  10                  15
Glu Leu Val Gly Gly Pro Pro Val Glu Ala Ser Ala Ala Ala Leu Ala
            20                  25                  30
Gly Asp Ala Ala Gly Ala Trp Arg Thr Ala Ala Val Glu Leu Ala Arg
        35                  40                  45
Ala Leu Val Arg Ala Val Ala Glu Ser His Gly Val Ala Ala Val Leu
    50                  55                  60
Phe Ala Ala Thr Ala Ala Ala Ala Ala Ala Val Asp Arg Gly Asp Pro
65                  70                  75                  80
Pro
```

<210> 18
<211> 294
<212> DNA
<213> M Tuberculosis

<220>
<221> CDS
<222> (1)...(294)

<400> 18

```
atg agt ttg ttg gat gcc cat att ccg cag ttg atc gct tcg cat acg       48
Met Ser Leu Leu Asp Ala His Ile Pro Gln Leu Ile Ala Ser His Thr
 1               5                  10                  15

gcg ttt gcc gct aag gcg ggg ttg atg cgg cat acg atc ggt cag gcc       96
Ala Phe Ala Ala Lys Ala Gly Leu Met Arg His Thr Ile Gly Gln Ala
            20                  25                  30

gag cag cag gcg atg tcg gcg cag gcg ttt cat cag gga gag tcc gcg      144
Glu Gln Gln Ala Met Ser Ala Gln Ala Phe His Gln Gly Glu Ser Ala
        35                  40                  45

gcg gcg ttt cag ggt gcg cat gcc cgg ttt gtg gcc gcg gcc gcc aag      192
Ala Ala Phe Gln Gly Ala His Ala Arg Phe Val Ala Ala Ala Ala Lys
     50                  55                  60

gtc aat acc ttg ctg gat atc gcg caa gcc aat ttg ggt gag gcc gcg      240
```

```
Val Asn Thr Leu Leu Asp Ile Ala Gln Ala Asn Leu Gly Glu Ala Ala
 65                  70                  75                  80

ggc acg tat gtg gcc gcc gat gcc gcc gcc gcg tcc agc tac acc ggg      288
Gly Thr Tyr Val Ala Ala Asp Ala Ala Ala Ala Ser Ser Tyr Thr Gly
                 85                  90                  95

ttt tta                                                              294
Phe Leu
```

<210> 19
<211> 97
<212> PRT
<213> M Tuberculosis

<400> 19

```
Met Ser Leu Leu Asp Ala His Ile Pro Gln Leu Ile Ala Ser His Thr
 1               5                  10                  15
Ala Phe Ala Ala Lys Ala Gly Leu Met Arg His Thr Ile Gly Gln Ala
            20                  25                  30
Glu Gln Gln Ala Met Ser Ala Gln Ala Phe His Gln Gly Glu Ser Ala
        35                  40                  45
Ala Ala Phe Gln Gly Ala His Ala Arg Phe Val Ala Ala Ala Ala Lys
    50                  55                  60
Val Asn Thr Leu Leu Asp Ile Ala Gln Ala Asn Leu Gly Glu Ala Ala
65                  70                  75                  80
Gly Thr Tyr Val Ala Ala Asp Ala Ala Ala Ala Ser Ser Tyr Thr Gly
                85                  90                  95
Phe
```

<210> 20
<211> 303
<212> DNA
<213> M Tuberculosis

<220>
<221> CDS
<222> (1)...(303)

<400> 20

```
atg aac gca gac ccc gtg ttg tcg tac aac ttt gac gcc atc gaa tac        48
Met Asn Ala Asp Pro Val Leu Ser Tyr Asn Phe Asp Ala Ile Glu Tyr
 1               5                  10                  15

tcc gtt cgt cag gag atc cac acc acc gcg gcc cgt ttc aac gct gcg        96
Ser Val Arg Gln Glu Ile His Thr Thr Ala Ala Arg Phe Asn Ala Ala
            20                  25                  30

ctg caa gag ctg agg tcg cag atc gcg ccg ttg cag cag ctc tgg aca       144
Leu Gln Glu Leu Arg Ser Gln Ile Ala Pro Leu Gln Gln Leu Trp Thr
        35                  40                  45

cgg gaa gcg gcc gcc gcc tac cac gcg gag caa ctc aag tgg cac cag       192
Arg Glu Ala Ala Ala Ala Tyr His Ala Glu Gln Leu Lys Trp His Gln
    50                  55                  60

gcg gcc agc gcg ctc aac gag atc ctg atc gac ttg gga aac gcg gtt       240
Ala Ala Ser Ala Leu Asn Glu Ile Leu Ile Asp Leu Gly Asn Ala Val
 65                  70                  75                  80
```

```
cgc cac ggt gcc gac gac gtg gcg cat gcc gac cgg cgg gcg gct gga      288
Arg His Gly Ala Asp Asp Val Ala His Ala Asp Arg Arg Ala Ala Gly
                 85                  90                  95

gct tgg gca cgc tag                                                303
Ala Trp Ala Arg  *
            100
```

<210> 21
<211> 100
<212> PRT
<213> M Tuberculosis

<400> 21

```
Met Asn Ala Asp Pro Val Leu Ser Tyr Asn Phe Asp Ala Ile Glu Tyr
 1               5                  10                  15
Ser Val Arg Gln Glu Ile His Thr Thr Ala Ala Arg Phe Asn Ala Ala
            20                  25                  30
Leu Gln Glu Leu Arg Ser Gln Ile Ala Pro Leu Gln Gln Leu Trp Thr
        35                  40                  45
Arg Glu Ala Ala Ala Ala Tyr His Ala Glu Gln Leu Lys Trp His Gln
    50                  55                  60
Ala Ala Ser Ala Leu Asn Glu Ile Leu Ile Asp Leu Gly Asn Ala Val
65                  70                  75                  80
Arg His Gly Ala Asp Asp Val Ala His Ala Asp Arg Arg Ala Ala Gly
                 85                  90                  95
Ala Trp Ala Arg
            100
```

<210> 22
<211> 378
<212> DNA
<213> M Tuberculosis

<220>
<221> CDS
<222> (1)...(378)

<400> 22

```
ttg gtt gaa ccg gga agg atc gga ggg aac cag acg agg ttg gcg gcg       48
Leu Val Glu Pro Gly Arg Ile Gly Gly Asn Gln Thr Arg Leu Ala Ala
 1               5                  10                  15

gtc cta ctt gat gtg agc aca ccg aac acg ctg aac gcc gac ttt gac       96
Val Leu Leu Asp Val Ser Thr Pro Asn Thr Leu Asn Ala Asp Phe Asp
            20                  25                  30

ctg atg cgt tcg gtt gcg ggt atc acg gac gcc cgc aat gag gaa atc      144
Leu Met Arg Ser Val Ala Gly Ile Thr Asp Ala Arg Asn Glu Glu Ile
        35                  40                  45

cgt gcg atg ctg cag gca ttc atc ggc cgc atg agc ggt gtg ccg ccg      192
Arg Ala Met Leu Gln Ala Phe Ile Gly Arg Met Ser Gly Val Pro Pro
    50                  55                  60

tcg gtg tgg ggt ggg ctc gcg gcc gct cgg ttc cag gat gtg gtg gat      240
Ser Val Trp Gly Gly Leu Ala Ala Ala Arg Phe Gln Asp Val Val Asp
65                  70                  75                  80

cgc tgg aac gcc gag tcg acg cgg ctc tac cac gtc ctg cac gcg atc      288
Arg Trp Asn Ala Glu Ser Thr Arg Leu Tyr His Val Leu His Ala Ile
                 85                  90                  95
```

```
gcc gac acc atc cgc cac aac gag gcc gcg ctg cgg gaa gcc ggc caa      336
Ala Asp Thr Ile Arg His Asn Glu Ala Ala Leu Arg Glu Ala Gly Gln
            100                 105                 110

atc cat gcc cgc cac atc gcc gcc gcc ggc ggc gac cta tag            378
Ile His Ala Arg His Ile Ala Ala Ala Gly Gly Asp Leu  *
        115                 120                 125


<210> 23
<211> 125
<212> PRT
<213> M Tuberculosis

<400> 23
Met Val Glu Pro Gly Arg Ile Gly Gly Asn Gln Thr Arg Leu Ala Ala
 1               5                  10                  15
Val Leu Leu Asp Val Ser Thr Pro Asn Thr Leu Asn Ala Asp Phe Asp
            20                  25                  30
Leu Met Arg Ser Val Ala Gly Ile Thr Asp Ala Arg Asn Glu Glu Ile
        35                  40                  45
Arg Ala Met Leu Gln Ala Phe Ile Gly Arg Met Ser Gly Val Pro Pro
    50                  55                  60
Ser Val Trp Gly Gly Leu Ala Ala Ala Arg Phe Gln Asp Val Val Asp
65                  70                  75                  80
Arg Trp Asn Ala Glu Ser Thr Arg Leu Tyr His Val Leu His Ala Ile
                85                  90                  95
Ala Asp Thr Ile Arg His Asn Glu Ala Ala Leu Arg Glu Ala Gly Gln
            100                 105                 110
Ile His Ala Arg His Ile Ala Ala Ala Gly Gly Asp Leu
        115                 120                 125

<210> 24
<211> 288
<212> DNA
<213> M Tuberculosis

<220>
<221> CDS
<222> (1)...(288)

<400> 24
atg tca gat caa atc acg tat aac ccg gga gcc gta tcc gac ttc gct       48
Met Ser Asp Gln Ile Thr Tyr Asn Pro Gly Ala Val Ser Asp Phe Ala
 1               5                  10                  15

tcc gac gtg ggc tcg cgc gcc ggc cag ctc cac atg att tac gaa gac       96
Ser Asp Val Gly Ser Arg Ala Gly Gln Leu His Met Ile Tyr Glu Asp
            20                  25                  30

acc gcc agc aaa aca aat gcg ctg caa gag ttt ttc gcg ggc cac ggc      144
Thr Ala Ser Lys Thr Asn Ala Leu Gln Glu Phe Phe Ala Gly His Gly
        35                  40                  45

gcg caa ggg ttt ttc gac gcc cag gcg cag atg ctg tcg ggg ctg cag      192
Ala Gln Gly Phe Phe Asp Ala Gln Ala Gln Met Leu Ser Gly Leu Gln
    50                  55                  60

ggg ctc att gag acg gtg ggt cag cat ggg act acc acc ggc cac gtg      240
Gly Leu Ile Glu Thr Val Gly Gln His Gly Thr Thr Thr Gly His Val
65                  70                  75                  80
```

```
ctg gac aac gcg atc gga acc gac cag gcc atc gcg ggc ttg ttc taa      288
Leu Asp Asn Ala Ile Gly Thr Asp Gln Ala Ile Ala Gly Leu Phe  *
                 85                  90                  95


<210> 25
<211> 95
<212> PRT
<213> M Tuberculosis

<400> 25
Met Ser Asp Gln Ile Thr Tyr Asn Pro Gly Ala Val Ser Asp Phe Ala
 1               5                  10                  15
Ser Asp Val Gly Ser Arg Ala Gly Gln Leu His Met Ile Tyr Glu Asp
            20                  25                  30
Thr Ala Ser Lys Thr Asn Ala Leu Gln Glu Phe Phe Ala Gly His Gly
        35                  40                  45
Ala Gln Gly Phe Phe Asp Ala Gln Ala Gln Met Leu Ser Gly Leu Gln
    50                  55                  60
Gly Leu Ile Glu Thr Val Gly Gln His Gly Thr Thr Thr Gly His Val
65                  70                  75                  80
Leu Asp Asn Ala Ile Gly Thr Asp Gln Ala Ile Ala Gly Leu Phe
                85                  90                  95

<210> 26
<211> 324
<212> DNA
<213> M Tuberculosis

<220>
<221> CDS
<222> (1)...(324)

      <400> 26
gtg gca gac aca att cag gta aca ccg cag atg ctg cgc agc acc gcc       48
Val Ala Asp Thr Ile Gln Val Thr Pro Gln Met Leu Arg Ser Thr Ala
 1               5                  10                  15

aac gat atc cag gcg aat atg gag caa gcc atg gga atc gcc aag ggc       96
Asn Asp Ile Gln Ala Asn Met Glu Gln Ala Met Gly Ile Ala Lys Gly
            20                  25                  30

tac cta gcc aac cag gaa aac gtc atg aac ccc gcc acc tgg tct ggt      144
Tyr Leu Ala Asn Gln Glu Asn Val Met Asn Pro Ala Thr Trp Ser Gly
        35                  40                  45

acc ggc gtc gtt gct tcg cat atg aca gcc acc gag atc acc aat gaa      192
Thr Gly Val Val Ala Ser His Met Thr Ala Thr Glu Ile Thr Asn Glu
    50                  55                  60

ttg aac aag gtc ctt acc ggg ggc acg cgc ctg gcc gag ggc ctc gtg      240
Leu Asn Lys Val Leu Thr Gly Gly Thr Arg Leu Ala Glu Gly Leu Val
65                  70                  75                  80

cag gcc gca gcc ctg atg gag gga cac gag gcg gac tcg cag aca gcg      288
Gln Ala Ala Ala Leu Met Glu Gly His Glu Ala Asp Ser Gln Thr Ala
                85                  90                  95

ttt cag gcg ctg ttc ggc gct agc cac gga tcc tga                      324
Phe Gln Ala Leu Phe Gly Ala Ser His Gly Ser  *
            100                 105
```

<210> 27
<211> 107
<212> PRT
<213> M Tuberculosis

<400> 27
```
Met Ala Asp Thr Ile Gln Val Thr Pro Gln Met Leu Arg Ser Thr Ala
 1               5                  10                  15
Asn Asp Ile Gln Ala Asn Met Glu Gln Ala Met Gly Ile Ala Lys Gly
            20                  25                  30
Tyr Leu Ala Asn Gln Glu Asn Val Met Asn Pro Ala Thr Trp Ser Gly
        35                  40                  45
Thr Gly Val Val Ala Ser His Met Thr Ala Thr Glu Ile Thr Asn Glu
    50                  55                  60
Leu Asn Lys Val Leu Thr Gly Gly Thr Arg Leu Ala Glu Gly Leu Val
65                  70                  75                  80
Gln Ala Ala Ala Leu Met Glu Gly His Glu Ala Asp Ser Gln Thr Ala
                85                  90                  95
Phe Gln Ala Leu Phe Gly Ala Ser His Gly Ser
            100                 105
```

<210> 28
<211> 273
<212> DNA
<213> M Tuberculosis

<220>
<221> CDS
<222> (1)...(273)

<400> 28
```
gtg gat ccg acc gtg ttg gct gat gcg gtg gcg cgg atg gcc gaa ttc       48
Val Asp Pro Thr Val Leu Ala Asp Ala Val Ala Arg Met Ala Glu Phe
 1               5                  10                  15

ggt cgc cac gtc gag gag ctg gtc gcc gag att gag tcc ttg gtt acc       96
Gly Arg His Val Glu Glu Leu Val Ala Glu Ile Glu Ser Leu Val Thr
             20                  25                  30

cgg ctg cat gtg acg tgg acg ggg gag ggc gcg gcg gct cat gct gag      144
Arg Leu His Val Thr Trp Thr Gly Glu Gly Ala Ala Ala His Ala Glu
         35                  40                  45

gcg caa cga cat tgg gct gcc ggt gag gcg atg atg cgc cag gcg ttg      192
Ala Gln Arg His Trp Ala Ala Gly Glu Ala Met Met Arg Gln Ala Leu
     50                  55                  60

gcc cag ctc acg gcc gcg ggg cag agc gcg cac gcc aac tac acc ggc      240
Ala Gln Leu Thr Ala Ala Gly Gln Ser Ala His Ala Asn Tyr Thr Gly
 65                  70                  75                  80

gcg atg gcc acg aat ttg ggt atg tgg tcg tga                          273
Ala Met Ala Thr Asn Leu Gly Met Trp Ser  *
                85                  90
```

<210> 29
<211> 90
<212> PRT
<213> M Tuberculosis

<400> 29
```
Met Asp Pro Thr Val Leu Ala Asp Ala Val Ala Arg Met Ala Glu Phe
```

```
 1               5                  10                  15
Gly Arg His Val Glu Glu Leu Val Ala Glu Ile Glu Ser Leu Val Thr
            20                  25                  30
Arg Leu His Val Thr Trp Thr Gly Glu Gly Ala Ala Ala His Ala Glu
        35                  40                  45
Ala Gln Arg His Trp Ala Ala Gly Glu Ala Met Met Arg Gln Ala Leu
    50                  55                  60
Ala Gln Leu Thr Ala Ala Gly Gln Ser Ala His Ala Asn Tyr Thr Gly
65                  70                  75                  80
Ala Met Ala Thr Asn Leu Gly Met Trp Ser
                85                  90
```

<210> 30
<211> 312
<212> DNA
<213> M Tuberculosis

<220>
<221> CDS
<222> (1)...(312)

<400> 30

```
atg ggt gcc gac gac acg ctg cgc gta gag cct gcg gtg atg cag ggt        48
Met Gly Ala Asp Asp Thr Leu Arg Val Glu Pro Ala Val Met Gln Gly
 1               5                  10                  15

ttc gcc gcg tcg ttg gat gga gcg gcc gag cat ctc gcg gtt caa ctg        96
Phe Ala Ala Ser Leu Asp Gly Ala Ala Glu His Leu Ala Val Gln Leu
            20                  25                  30

gcc gag ctg gac gct cag gtc ggg cag atg ttg ggc ggg tgg cgc ggg       144
Ala Glu Leu Asp Ala Gln Val Gly Gln Met Leu Gly Gly Trp Arg Gly
        35                  40                  45

gcg tcg ggc agt gcg tat ggc tcg gcg tgg gag cta tgg cat cgc ggg       192
Ala Ser Gly Ser Ala Tyr Gly Ser Ala Trp Glu Leu Trp His Arg Gly
    50                  55                  60

gcc ggt gag gtg cag ctg gga ttg tcg atg ctg gcg gcg gcg ata gct       240
Ala Gly Glu Val Gln Leu Gly Leu Ser Met Leu Ala Ala Ala Ile Ala
65                  70                  75                  80

cac gcc ggt gcg ggt tat caa cac aac gag acc gcg tcg gcg cag gtg       288
His Ala Gly Ala Gly Tyr Gln His Asn Glu Thr Ala Ser Ala Gln Val
                85                  90                  95

ctt cgt gag gtg ggc ggt ggc tga                                      312
Leu Arg Glu Val Gly Gly Gly  *
            100
```

<210> 31
<211> 103
<212> PRT
<213> M Tuberculosis

<400> 31

```
Met Gly Ala Asp Asp Thr Leu Arg Val Glu Pro Ala Val Met Gln Gly
 1               5                  10                  15
Phe Ala Ala Ser Leu Asp Gly Ala Ala Glu His Leu Ala Val Gln Leu
            20                  25                  30
Ala Glu Leu Asp Ala Gln Val Gly Gln Met Leu Gly Gly Trp Arg Gly
        35                  40                  45
```

Ala Ser Gly Ser Ala Tyr Gly Ser Ala Trp Glu Leu Trp His Arg Gly
50 55 60
Ala Gly Glu Val Gln Leu Gly Leu Ser Met Leu Ala Ala Ala Ile Ala
65 70 75 80
His Ala Gly Ala Gly Tyr Gln His Asn Glu Thr Ala Ser Ala Gln Val
85 90 95
Leu Arg Glu Val Gly Gly Gly
100

<210> 32
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> cloning primer

<400> 32
ctgagatcta tgagcctttt ggatgc 26

<210> 33
<211> 31
<212> DNA
<213> Artificial Sequence

<220>
<223> cloning primer

<400> 33
ctaagcttgg atcctcagaa cccggtatag g 31

<210> 34
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> cloning primer

<400> 34
ctgagatctt tgatccccgg tcggatggtg 30

<210> 35
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> cloning primer

<400> 35
ctcccatggg tcaggtgatc gaatcagcca 30

<210> 36
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> cloning primer

<400> 36
ctgagatcta tgaccatcaa ctatc 25

<210> 37
<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> cloning primer

<400> 37
ctaagcttgg atccttaggc ccagctggag cc 32

<210> 38
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> cloning primer

<400> 38
ctgagatcta tgaccatcaa ctatc 25

<210> 39
<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> cloning primer

<400> 39
ctaagcttgg atcctcaggc ccagctggag cc 32

<210> 40
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> cloning primer

<400> 40
ctgagatctg tgcttttgcc tcttggtccg 30

<210> 41
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> cloning primer

<400> 41
cccaagcttc tagccggccg ccggaga 27

<210> 42
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> cloning primer

<400> 42
ctgagatctt tgacccacaa gcgcactaaa 30

<210> 43
<211> 31
<212> DNA
<213> Artificial Sequence

<220>
<223> cloning primer

<400> 43
ctcccatggt cactgtttcg ctgtcgggtt c 31

<210> 44
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> cloning primer

<400> 44
ctgagatcta tgagcggcca cgcgttggct 30

<210> 45
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> cloning primer

<400> 45
ctcccatggt cacggcggat caccccggtc 30

<210> 46
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> cloning primer

<400> 46
ctgagatcta tgagtttgtt ggatgcccat 30

<210> 47
<211> 30
<212> DNA
<213> Artifical sequence

<400> 47
ctcccatggt taaaacccgg tgtagctgga 30

<210> 48
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> cloning primer

<400> 48
ctgagatcta tgaacgcaga ccccgtg 27

<210> 49
<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> cloning primer

<400> 49
ctaagcttgg atccctagcg tgcccaagct cc 32

<210> 50
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> cloning primer

<400> 50
ctgagatcta tggttgaacc gggaagg 27

<210> 51
<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> cloning primer

<400> 51
ctaagcttgg atccctatag gtcgccgccg gc 32

<210> 52
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> cloning primer

<400> 52
ctgagatcta tgtcagatca aatcacg 27

<210> 53
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> cloning primer

<400> 53
ctaagcttgg atccttagaa caagcccgcg 30

<210> 54
<211> 28
<212> DNA
<213> Artificial Sequence

<220>
<223> cloning primer

<400> 54
ctgagatcta tggcagacac aattcagg 28

<210> 55
<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> cloning primer

<400> 55
ctaagcttcc cgggtcagga tccgtggcta gc 32

<210> 56
<211> 28
<212> DNA
<213> Artificial Sequence

<220>
<223> cloning primer

<400> 56
ctgagatcta tggatccgac cgtgttgg 28

<210> 57
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> cloning primer

<400> 57
ctgccatggt cacgaccaca taccc 25

<210> 58
<211> 26
<212> DNA
<213> Artificial Sequence

<220>
<223> cloning primer

<400> 58
ctgagatcta tgggtgccga cgacac 26

<210> 59
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> cloning primer

<400> 59
ctaagcttgg atcctcagcc accgcccacc 30